

The Greening of South Carolina: Examples from Germany

Grade Level: Grade 5
Content Areas: Social Studies, Science
Time to Complete: Three weeks
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1. South Carolina Curriculum Standards Addressed (T = Targeted, I = Introduced, R = Reinforced/Reviewed)

- **Social Studies**

- 5.8.1 discuss the importance of political leadership and public service in school, community, state, and nation (T)
- 5.8.3 explain how citizens can influence policies and decisions by working with others (T)
- 5.8.4 formulate personal opinions and communicate them to key decision and policy makers (T)
- 5.11.13 describe how humans interact with various ecosystems (I)
- 5.13.3 analyze ways to make informed decisions regarding social and environmental problems (T)

- **Science**

- II. Life Science

- B. Populations and Ecosystems

- 4. The number of organisms an ecosystem can support depends on the resources available. (I)
 - d. Evaluate the impact of the environment on populations of organisms. (I)
 - e. Draw conclusions about the influence of human activity on ecosystems. (I)
 - f. Discuss ways to minimize the negative impact of technology/industrialization on ecosystems and to maximize the positive impact. (I)

2. Lesson/Unit Description

This unit will provide students with examples of the environmental practices in a number of German cities that they will compare with practices in their own communities. These practices are categorized as those pertaining to waste management/recycling, energy conservation, alternative energy, and transportation.

Students will use the German examples, combine them with examples near their homes, and create a presentation depicting new ways to raise environmental awareness in their local communities and to act on this awareness in their own lives.

Students will also select a topic generated during class discussion of the German photographs to research and create a presentation.

3. Focus Questions for Students

Social Studies

- Is it important to protect the environment?
- What can people do to take care of the environment?
- How could a person affect another person's environmental practices?
- What can we learn from Germany?
- Is Germany green?

4. Culminating Assessment

Students will research environmental practices in their communities through interviews and library research. Students will explore methods to enable them to become more environmentally conscious while encouraging others to do the same. Students will present their findings to the class.

5. Materials/Equipment/Resources

Included in this lesson:

- pictures pertaining to climate control (attachment 1)
- pictures of recycling practices in Germany, with question sheet and answer key (attachment 2)
- pictures pertaining to transportation in Germany, with question sheet and answer key (attachment 3)
- pictures pertaining to energy conservation in Germany, with question sheet and answer key (attachment 4)
- homework assignment sheet (attachment 5)
- graphic organizer for research writing (attachment 6)
- writing scoring rubric (attachment 7)
- notes on German environmental practices (attachment 8)
- lyrics to "Big Yellow Taxi" (attachment 9)
- list of Internet resources (attachment 10)

Also needed to conduct this lesson:

- Internet access

6. Teacher Preparation

- A. Research recycling programs and environmental awareness programs/activities in your local communities to provide students with local examples.
- B. Clip current articles from the newspaper that deal with environmental issues to serve as additional resources.
- C. Check out any books that your school media center has about taking care of the environment.

7. Procedures:

Teacher Activities	Student Activities	Assessments
Day 1 Generate a class discussion on environmental issues by using the focus questions.	Participate in the discussion.	Teacher observation and notes on student comments
Lead students in the creation of KWL (what I know , what I want to know, what I learned) charts about good environmental practices.	Offer suggestions to be placed on the class KWL chart. Make an individual KWL chart.	Class discussion and teacher notes on student suggestions for the class KWL chart Teacher examination of student reports for evidence of students' researching what they want to learn.
Show students the pictures pertaining to climate control in Germany (attachment 1).	View photographs and discuss them with the class as a whole.	Teacher notes on student comments

Teacher Activities	Student Activities	Assessments
<p>Instruct students that they will be given pictures of good environmental practices in Germany to examine and questions to answer based on the photographs. Give students for approximately 15 minutes to complete the exercise. Circulate among students to facilitate discussion/analysis of photographs.</p> <p>Ask students to present their findings to the class and will add additional information from the answer keys.</p>	<p>Break up into three groups: group 1 receives pictures and questions about recycling practices in</p> <ul style="list-style-type: none"> Germany (attachment 2), group 2 receives pictures and questions about transportation (attachment 3), and group 3 receives pictures and questions about energy conservation (attachment 4). <p>Complete the questions based on the photographs and prepare to present the information to the class.</p> <p>Present your group's photographs and answers to the class.</p>	<p>Teacher observation and notes on the students' answers to the questions about the pictures</p>
<p>Ask students if these German examples can serve as role models for others to be more "environmentally friendly."</p>	<p>Write a list of ways you can improve your environmental practices. (Keep the list you have written.)</p>	<p>Teacher observation and notes on student responses</p>
<p>Ask students if, based on these photographs, they could infer that Germany is "green."</p>	<p>Support your inferences based on your observations.</p>	<p>Teacher observation and notes on student inferences and observations</p>

Teacher Activities	Student Activities	Assessments
Assign part 1 of the homework (attachment 5) with due date for part 2 calculated to fit the class schedule.	Complete part 1 of the homework assignment.	Teacher check for homework completion Teacher evaluation of part 1 of the homework assignment Teacher observations and notes on student discussions and participation
Day 2 Share ways you could improve environmental practices in your home.	Give an oral summary of your findings for part 1 of the homework assignment. Participate in group discussion analyzing class findings.	Teacher observation and notes on the student findings and responses
Set the due date for part 2 of the homework assignment.	Share with the class your findings about environmental practices in your neighborhood. Choose the practices you wish to endorse and begin the prewriting of a persuasive letter encouraging others in your neighborhood to follow the practice.	Teacher observation and notes on the student presentations
	Complete the letter writing process (rough draft, revision, final copy).	Writing scoring rubric (attachment 7) to grade students' letters

Teacher Activities	Student Activities	Assessments
	<p>Present your letter to the class on the assigned due date and then mail the letter to your neighbors.</p>	<p>Teacher observation and notes on the student presentations</p>
<p>Inform students they are about to be engaged in a research project that examines some portion of the environmental industry.</p> <p>Discuss lists individually with students to guide their initial research.</p> <p>Assist students in locating information and editing their writing.</p> <p>Set the due date for the research project.</p>	<p>Brainstorm a list of environmental issues/practices suitable as research topics and questions.</p> <p>Begin researching your topics and complete the research by employing the writing process.</p> <p>Complete the “learned” portion of your KWL chart.</p>	
	<p>Turn in your research paper on the assigned due date.</p> <p>Present your research to the class in an oral report on the assigned due date.</p>	<p>Writing scoring rubric to grade students’ research papers</p> <p>Teacher observations and notes on students’ oral reports</p>

8. Differentiation of Instruction

Both writing activities need to be adjusted to suit the needs of individual students. Research abilities vary greatly among students, so this must be considered as well. The teachers may find it helpful to ask a parent volunteer to help out when research or writing is being done in the classroom. It is recommended that the computer lab teacher be asked to assist students in conducting electronic research. A strong teacher presence is suggested for all student research. The graphic organizer for research writing (attachment 6) provides students with a chart to assist them in documenting their sources.

Students may elect to send a copy of their persuasive letter to the local newspaper as an editorial. Students could begin a recycling program at their school. Educating other students about their findings and providing suggestions for others to improve their practices is also a possibility. Persuasive letters to neighbors could be sent via e-mail.

“Big Yellow Taxi,” from Joni Mitchell’s album *Ladies of the Canyon*, can be played as an initiating activity for the entire lesson, an introduction to the student presentations, or as a culminating activity at the end of all the presentations. The song’s lyrics, which are about protecting the environment, could be displayed on the overhead. Students could draw a visual representation of the song and write additional lyrics that coincide with their individual research. The class could create an energy conservation plan for the school.

Attachment 1

Conservation: Pictures Pertaining to Climate Control

These three pictures were taken at a retirement apartment complex in Frankfurt, Germany. I found it quite interesting to compare them to conditions in my aunt's apartment complex near Chicago, where the heat and air conditioning are controlled by the manager. The manager typically turns the heat off in the entire building during the first warm spell in spring; needless to say the tenants can become very cold during those chilly days that often follow. And then there are many times when Aunt Katherine has to open her window in the cold Chicago winter because her heat is blowing so hard she can barely breathe.



The knob on the radiator allows the individual to adjust the amount of hot water moving through the radiator and consequently the amount of heat produced in the bathroom and the amount of hot water used. A higher setting will produce a hotter bathroom and a higher hot water bill. Each person has different physiology, so some individuals may be perfectly comfortable with the lowest setting.



The thermometer was hung on the radiator to give an accurate reading of the heat being produced.



The hot water meter registers the hot water use for the apartment. The entire building has one hot water heater, but each apartment is charged by its individual usage. Obviously, hot water is more expensive to produce than cold water, so those who use less hot water pay less.

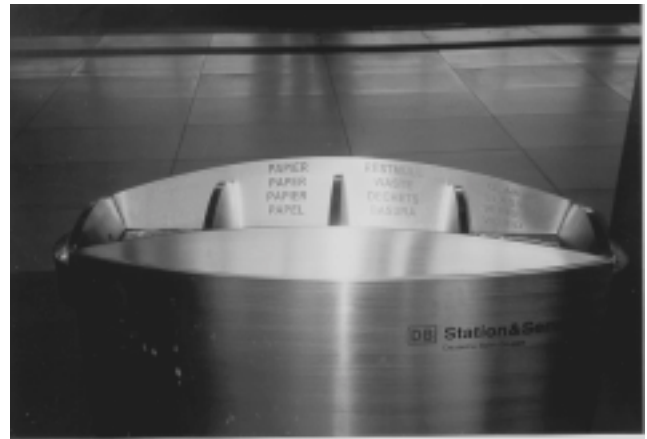
Attachment 2

Recycling Practices in Germany

Question 1



Question 2



Question 3



Question 4



Question 5



Questions about Pictures of Recycling Practices in Germany

Group members: _____

1. What is this? What could it be used for? What clues from the picture could help you figure out what this is?
2. Look at this picture of the same object from a different angle. What do think the object is used for?
3. What do you think of these two recycling bins? Do you think more people would recycle with bins like this, as opposed to the way your community handles recycling, or not? Explain your answer.
4. What is this woman standing beside? What is it used for? Why is it so large? Have you ever seen a container like this in your community?
5. This photo was taken at Zeppelin Field, where the people were getting ready to host a large activity. Why are there so many recycling bins? What does this tell you about the anticipated crowd? Do you think all events in Germany are equipped to handle trash disposal like this?

ANSWER KEY

Questions about Pictures of Recycling Practices in Germany

1. *What is this? What could it be used for? What clues from the picture could help you figure out what this is?*

Accept reasonable responses. Clues may be difficult to notice because it is hard to see the labels. This is a recycling container located in the Frankfurt Train Station.

2. *Look at this picture of the same object from a different angle. What do think the object is used for?*

This is a recycling container located in the Frankfurt Train Station.

3. *What do you think of these two recycling bins? Do you think more people would recycle with bins like this, as opposed to the way your community handles recycling, or not? Explain your answer.*

Answers will vary.

4. *What is this woman standing beside? What is it used for? Why is it so large? Have you ever seen a container like this in your community?*

Karen is standing near a large recycling bin in the city of Nuremberg. It is so large because it was located at an intersection of two roads where there were several shops and apartments.

5. *This photo was taken at Zeppelin Field, where the people were getting ready to host a large activity. Why are there so many recycling bins? What does this tell you about the anticipated crowd? Do you think all events in Germany are equipped to handle trash disposal like this?*

Judging by the number of recycling bins, there will probably be a great many people at this event, and they will most likely be purchasing beverages in recyclable containers. Chances are that most large events in Germany are equipped to handle recyclable materials.

Attachment 3

Transportation in Germany

Question 1



Question 2



Question 3



Question 3



Question 3



Question 4



Question 5



Question 6 (Germany)



Question 6 (South Carolina)



Questions about Pictures Pertaining to Transportation in Germany

Group members: _____

1. What would be some benefits of owning/operating a car like this? What would be some disadvantages in owning/operating a car like this?
2. What does the round sign at the top mean? Why would this be an important sign to read?

What do these signs tell you about transportation in Germany?

3. What can you infer about the Germans' health by looking at these three pictures?

What can you infer about harmful emissions by looking at these three pictures?

4. At whom is the man in the suit probably yelling? What do you think he is saying? What do you think the woman on the bicycle is thinking?
5. These are stairs leading to the subway. What do you notice about them? Is anything unusual? Why do the stairs not go all the way to the wall?
6. Compare these pictures of German streets to those of South Carolina streets. What differences do you see? What do you notice about the vehicles? What can this tell you about gasoline consumption?

ANSWER KEY

Questions about Pictures Pertaining to Transportation in Germany

1. *What would be some benefits of owning/operating a car like this? What would be some disadvantages in owning/operating a car like this?*

Possible benefits: such a car is fuel efficient and therefore inexpensive to run; it is easy to park and to drive into small places, and it is less expensive to purchase than larger cars.

Possible disadvantages are not a lot of cargo space, hard for large people to fit comfortably in it, easily damaged in an accident/ hard for other cars to see, nor practical for large families.

2. *What does the round sign at the top mean? Why would this be an important sign to read?*

This sign means that the right lane is for pedestrians and the left lane is for cyclists (a cycle path). It would be an important sign to read because of safety: cyclists and pedestrians might run into each other.

What do these signs tell you about transportation in Germany?

These are signs for cyclists. They tell me that a lot of people in Germany get around by bicycle. (Bicycles are ridden in every German city and community I visited.)

3. *What can you infer about the Germans' health by looking at these three pictures?*

Bicycling is very good exercise, so one can infer that people who ride bikes are in good health or at least in good physical shape. (These are photographs of bike racks in Leipzig, a shopper in Leipzig, and a letter carrier in Berlin.)

What can you infer about harmful emissions by looking at these three pictures?

One could infer that greenhouse emissions in Germany are lower than in the United States because steps are being taken to reduce automobile use. The signs are evidence that people are using alternatives to the automobile for their transportation.

4. *At whom is the man in the suit probably yelling? What do you think he is saying? What do you think the woman on the bicycle is thinking?*

The man in the suit is probably yelling at the pedestrian in the cycle path. He might be saying "Get out of the way!" or "Watch out!" The cyclist is probably thinking "Get out of my way!"

5. *These are stairs leading to the subway. What do you notice about them? Is anything unusual? Why do the stairs not go all the way to the wall?*

Observations will vary. The stairs do not go all the way to the wall because the "ramp" is for bicycles. This makes it a lot easier for cyclists to get their bikes into the subway when they need public transportation.

6. *Compare these pictures of German streets to those of South Carolina streets. What differences do you see? What do you notice about the vehicles? What can this tell you about gasoline consumption?*

The cars on German streets are much smaller than the cars in South Carolina. You can see several vans and sport utility vehicles in the South Carolina pictures. During my entire field experience, I saw fewer than twenty trucks or vans, and I encountered no SUVs at all. Smaller cars are much more energy efficient than larger vehicles and therefore produce less harmful emissions.

Attachment 4

Energy Conservation in Germany

Question 1



Question 2



Question 3



Question 4



Question 5



Questions about Pictures Pertaining to Energy Conservation in Germany

Group members: _____

1. What do you notice about this toilet? Hint: look at the buttons on the wall. What do you think they are for?
2. This is a device that you had to put your room key in upon entering your room at the Park Hotel in Leipzig. What do you think this device is used for?
3. All of the German hotels I stayed in had similar signs to this one. It says, “Water is precious. Dear Guests, using towels only once and handing them in to be laundered—doesn’t it seem a little extravagant in your eyes as well? But do you know what? You can do something about that! Please return the towels that you would like to use again to the rack and leave those that need to be laundered on the floor. Thank you very much.”

Do you think that such a sign is a good idea? Why or why not?

Do you think that most people read the sign and practice what it asks them to do? Do you think it is important to save water? Why or why not?

4. This picture is of a meeting room. What do you notice about this room? Can you see any evidence of energy conservation?

Most of the meetings I attended were in rooms with light-colored walls, minimal electric lighting, and no air conditioning. Why were the rooms designed that way? What benefit does this provide?

5. This is the Reichstag Building in Berlin, which houses the *Bundestag*, the lower house of the parliament of the Federal Republic of Germany. The dome of this building is made of glass. There are several reasons why glass was chosen when the building was reconstructed. One reason is political and symbolic. The glass dome represents the fact that the German government is transparent: it is not hiding secrets. Another reason is environmental. What would be the environmental benefits of having a glass dome?

ANSWER KEY

Questions about Pictures Pertaining to Energy Conservation in Germany

1. *What do you notice about this toilet? Hint: look at the buttons on the wall. What do you think they are for?*

The buttons above the toilet are for different amounts of water needed for flushing. The larger button yields a greater flush.

2. *This is a device that you had to put your room key in upon entering your room at the Park Hotel in Leipzig. What do you think this device is used for?*

This device was needed to operate the lights in the hotel. As soon as the key was removed from it, any lights that were on in the room were turned off. This ensured that lights were not left on when no one was in the room. Some public places have light sensors in the bathrooms that turns lights on as a person enters and turns lights off when the room is vacated.

3. *All of the German hotels I stayed in had similar signs to this one. It says, “Water is precious. Dear Guests, using towels only once and handing them in to be laundered—doesn’t it seem a little extravagant in your eyes as well? But do you know what? You can do something about that! Please return the towels that you would like to use again to the rack and leave those that need to be laundered on the floor. Thank you very much.”*

Do you think that such a sign is a good idea? Why or why not?

Do you think that most people read the sign and practice what it asks them to do? Do you think it is important to save water? Why or why not?

Answers will vary. Accept reasonable responses.

4. *This picture is of a meeting room. What do you notice about this room? Can you see any evidence of energy conservation?*

Most of the meetings I attended were in rooms with light-colored walls, minimal electric lighting, and no air conditioning. Many had several mirrors to help reflect light, making the room seem brighter than it actually was. Curtains were usually light colored to allow natural light in as well.

5. *This is the Reichstag building in Berlin, which houses the Bundestag, the lower house of the parliament of the Federal Republic of Germany. The dome of this building is made of glass. There are several reasons why glass was chosen when the building was reconstructed. One reason is political and symbolic. The glass dome represents the fact that the German government is transparent: it is not hiding secrets. Another reason is environmental. What would be the environmental benefits of having a glass dome?*

In addition to allowing light into the Parliament chamber, this dome was constructed to act as a vacuum. There is an opening in the dome that creates a flow of air to draw heat out of the

building in the summer. This saves in cooling costs tremendously. According to our guide, approximately 7,000 kilowatts was required to cool the old Reichstag building before the glass dome was installed. Now, due to the construction of the new dome, the watt usage has dropped to below 300.

Attachment 5
Homework Assignment

Part 1

Based on the exposure to German environmental practices that you received today, search for similar examples practiced in your home. List those examples and bring your list to school tomorrow.

Part 2

Interview at least three neighbors this week and ask them what environmental practices are done in their home. Take notes during your interviews. After you interview people from at least three households, write a brief summary that assesses environmental practices in your neighborhood apartment complex. With this summary, write a persuasive letter to your neighbors trying to convince them to adopt a new environmentally friendly practice.

Attachment 6

Graphic Organizer for Research Writing

Use this form to help organize your research. After you select your topic, brainstorm a list of questions you may have. As you conduct your research and find answers to your questions, record them in the box with the source information in the source box.

For the books that you use as sources, record the following in this order: the author's last name, the author's first name, the title of the book, the city of publication, the name of the publisher, and the publication date (year).

For Internet resources, record the complete Web address. REMEMBER that *.com* sites are commercial sites and could be stating someone's opinion, not actual facts! Try to find sites ending in *.org* (nonprofit sites), *.edu* (education sites), or *.gov* (government sites).

Topic:	Source 1	Source 2	Source 3
Question 1			
Question 2			
Question 3			
Question 4			

Attachment 7

Scoring Rubric for Research Writing

Area	Points Possible	Points Earned
Content Extensive development of topic with strong research support. Good development of topic; many supporting details. Adequate development of topic; slight research support. Weak development of topic; little or no research support.	4 3 2 1	
Organization Extremely organized; superb flow, sequence, and conclusion. Fairly well organized; attempt at sequence of information. Poorly organized; lack of sequence of information. Not organized.	4 3 2 1	
Voice Strong voice throughout paper; the reader is hooked. Good development of voice; minor weaknesses/dull spots. Voice can barely be heard; a real sleeper.	3 2 1	
Vocabulary Excellent and appropriate use of topic-related vocabulary. Good word choice; meaning is clear. Poor word choice or misuse of vocabulary.	3 2 1	
Sentence Structure Sentence length and types are well varied. Adequate sentences; some variation in type and length. Choppy sentence with little variety. Poor sentence structure; no variety.	4 3 2 1	
Conventions Error free 1–5 errors 6–10 errors Over 10 points	4 3 2 1	
Comments:		Total score:

Attachment 8

Notes on Germany and the Environment

Germany is taking several steps to reduce the impact of humans on the environment. What follows here is a brief summary of some major points that could be used for student research:

- The German government has the Federal Environment Ministry, which is in charge of environmental issues at the federal level. Three important branches of this organization are the Federal Environmental Agency in Berlin, the Federal Office for Radiation Protection in Salzgitter, and the Federal Office for Nature Conservation in Bonn.
- Germany's energy policy includes efforts to economize on energy consumption and to investigate ways to find renewable energy sources. Germany is gradually discontinuing the use of nuclear energy. In addition, since reunification the government has also been focused on reversing land depletion trends and reducing emissions to help improve air quality.
- There is an attempt to encourage the agriculture industry to reduce its use of chemical fertilizers and pesticides.
- In 1992, the "Green Dot" laws came into effect, placing on manufacturers the responsibility for making goods out of recycled materials. Items sold in stores have a green dot on them to signify that a portion of the cost of the item is going into recycling the packaging.
- In 1994, amendments to the Basis Law included a commitment to protect the environment.
- Tough legislation has been enforced to clean and protect German waterways.
- The German government encourages developing nations to be environmentally responsible in such areas as natural resource conservation and economic development and gives them assistance in carrying out sound environmental practices.

(Source: Kappler, Arno, ed. *Facts about Germany*. Translated by Kathleen Müller-Rostin. Frankfurt am Main: Societäts-Verlag, 1999.)

Attachment 9
Big Yellow Taxi

They paved paradise
And put up a parking lot
With a pink hotel, a boutique
And a swinging hot spot

Don't it always seem to go
That you don't know what you've got
Till it's gone
They paved paradise
And put up a parking lot

They took all the trees
Put 'em in a tree museum
And they charged the people
A dollar and a half just to see 'em

Don't it always seem to go
That you don't know what you've got
Till it's gone
They paved paradise
And put up a parking lot

Don't it always seem to go
That you don't know what you've got
Till it's gone
They paved paradise
And put up a parking lot

Late last night
I heard the screen door slam
And a big yellow taxi
Took away my old man

Don't it always seem to go
That you don't know what you've got
Till it's gone
They paved paradise
And put up a parking lot

They paved paradise
And put up a parking lot

—Joni Mitchell
©Siquomb Publishing, 1969

Attachment 10

Internet Resources

- Information from INFORM, Inc., about environmental practices:
<http://www.informinc.org/publications.html>
- Information from the National Recycling Coalition, Inc., about recycling incentives in the United States, with links to Web sites about other environmental issues and practices:
<http://www.nrc-recycle.org/>
- The *State* newspaper, in Columbia, South Carolina:
<http://www.thestate.org>
- The German Federal Environment Ministry, with information on German environmental programs:
<http://www.bmu.de/english/fset1024.php>
- Information about low-interest loans offered to German citizens in Germany for such practices as the installation of low-energy heating systems, solar panels for electricity or warm-water generation, and energy-efficient windows and walls. Students could do research to report on these loan incentives and to compare/contrast the availability of such loans in Germany with what is available in the United States. Students could write a persuasive paper for bankers or politicians to encourage these types of loans here.
<http://www.kfw.de/EN/inhalt.jsp>